

## Description

The present invention concerns a transport securing arrangement for a side extension arm of a vehicle having a locking device and an additional securing hook.

5 By increasing the support surface, side extension arms of that kind increase the stability of the parked vehicle, whereby, for example in the case of a vehicle fitted with a crane, the steadiness of the vehicle is increased. While the vehicle is moving it is necessary to ensure that the side extension arms remain in their fully retracted transport position and do not by mistake move into a partially or completely extended position.

10 In this connection, a regulating standard requires that transport securing arrangements for side extension arms of this kind, besides a locking device which is hitherto already usual, must have an additional independent securing hook.

The object of the invention, in transport securing arrangements of the general kind set forth, is to ensure easy handling, in spite of the duplication of the securing

15 systems.

In accordance with the invention that is achieved in that the locking device is arranged in relation to the securing hook in such a way that release of the locking device leads to release of the securing hook from its anchorage.

The arrangement according to the invention provides that both securing systems

20 can be released by one movement of the hand.

An advantageous embodiment of the invention provides that the securing hook is mounted pivotably. Advantageously, there may be provided a spring which urges the securing hook into the anchorage position in order to prevent it from unintentionally pivoting open. In order to optimise reliability, the locking device can also be acted upon

25 by a spring in the direction of the locking position.

The locking device is advantageously releasable by rotation. That can be embodied for example structurally in that the locking device has at least one guide surface which extends inclinedly relative to the longitudinal center line of the locking device, wherein upon rotation of the locking device the guide surface slides along a pin.

30 To facilitate handling of the locking device, it is releasable independently of the direction of rotation by rotary movement, and that can be embodied by the arrangement of two guide surfaces involving opposite screw directions.

A structurally particularly simple embodiment of the invention provides that the securing hook partially bears against a portion of the locking device, which is eccentrically shaped, for example of a cam-shaped configuration.

Further features and details of the invention will be apparent from the specific  
5 description hereinafter. In the drawing:

Figure 1a shows a vehicle with side extension arms which are secured by a transport securing arrangement according to the invention,

Figure 1b shows a detail view relating to the Figure 1a structure, showing the arrangement of the locking device according to the invention on the vehicle,

10 Figures 2a, 2b and 2c are a plan view, a longitudinal section and a cross-section of the transport securing arrangement according to the invention with a side extension arm in the secured and locked transport position,

Figures 3a, 3b and 3c show a plan view, a longitudinal section and a cross-section of the transport securing arrangement after a first release step,

15 Figures 4a, 4b, 4c and 4d show a plan view, a side view, a cross-section and a further side view of the transport securing arrangement according to the invention in the transport position and partly unlocked condition,

Figure 5 is a view in cross-section of the transport securing arrangement according to the invention in a partly unlocked condition,

20 Figures 6a, 6b and 6c show a plan view, a longitudinal section and a cross-section of the transport securing arrangement in the unlocked transport position,

Figures 7a, 7b and 7c show a plan view, a longitudinal section and a cross-section of the transport securing arrangement in the unlocked transport position,

25 Figures 8a, 8b and 8c show a plan view, a longitudinal section and a cross-section of the transport securing arrangement according to the invention after the side extension arm has been partly moved out,

Figures 9a, 9b and 9c show a plan view, a longitudinal section and a cross-section of the transport securing arrangement in the locked working position,

30 Figures 10a, 10b and 10c show a plan view, a longitudinal section and a cross-section of the transport securing arrangement in the unlocked working position, and

Figures 11a, 11b and 11c show the transport securing arrangement with the side extension arm partly pushed in.

Figure 1a shows a vehicle 14 with a vehicle superstructure in the form of a crane, wherein the vehicle 14 has two side extension arms 15 and the right side extension arm 15 has been moved completely into its working position. Figure 1b shows a detail view of Figure 1a in which it is possible to see the arrangement of the transport securing arrangement according to the invention.

Figure 2a shows a plan view of the transport securing arrangement, wherein it is possible to see the two constituent parts of the transport securing arrangement, which are arranged stationarily on the vehicle superstructure, more specifically the locking device 1 and the securing hook 10. In the illustrated embodiment the securing hook 10 is urged by a spring 3 in the direction of its anchorage position. The locking device 1 is supported rotatably and can be rotated by the operator by way of the handle 9. It is also possible to see the cam-shaped portion 7 of the locking device 1, which portion 7 is also rotated upon actuation of the handle 9. The cam-shaped portion 7 has a recess 16, wherein in the illustrated condition the locking device 1 is safeguarded against unintentional actuation by the clamping lever 2 which fixes the cam-shaped portion 7 at the recess 16 thereof in positively locking relationship.

Figure 2b shows a cross-section taken along line A-A in Figure 2a, additionally showing the pin portion 4 which is arranged on the side extension arm 15 and which forms the anchorage position of the securing hook 10, and the pin 6 for anchoring the locking device 1. The pin 6 is urged by the spring 12 in the direction of the illustrated locking opening 13. Unintentional movement of the side extension arm 15 out of its secured and locked transport position as illustrated is prevented both by the securing hook 10 which embraces the pin portion 4 and also, independently thereof, by the pin 6 which is introduced into the anchorage opening 13.

Figure 2c shows a cross-section taken along line B-B in Figure 2b, in which it is additionally possible to see a projection 18 arranged on the securing hook 10. In its illustrated anchorage position, the securing lever 10 which embraces the pin portion 14 rests against a support surface 23 on the static part, connected to the vehicle 14, of the locking device 1.

Identical components of the arrangement will not be repeatedly identified in the Figures to be described hereinafter. The following Figures successively show the

transfer of the side extension arm 15 from its secured and locked transport position into its fully extended working position and back again.

It can be seen from Figure 3a that, in a first step, the clamping lever 2 was pivoted to release the locking device 1 so that the locking device 1 is now rotatable by way of the handle 9. Figure 3b shows a longitudinal section through the transport securing arrangement taken along line A-A in Figure 3a. Figure 3c shows a cross-section through the transport securing arrangement according to the invention taken along line B-B in Figure 3b.

In Figure 4a, as the next step, the cam-shaped portion 7 was rotated in the counter-clockwise direction by rotation of the handle 9, whereby on the one hand the pin 6 was moved out of its anchorage opening 13 and on the other hand, by the rotation of the cam-shaped portion 7, the securing hook 10 was pivoted away from the pin portion 4, by way of the projection 18 arranged on the securing hook. Figure 4b shows a side view of the transport securing arrangement according to the invention. Figure 4c shows a cross-section through the transport securing arrangement according to the invention, taken along line D-D in Figure 4b. Figure 4d shows a further side view of the transport securing arrangement according to the invention viewing along line X in Figure 4c in which it is possible to see a pin 17 arranged on the static housing of the locking device 1. It is also possible to see one of the - in this embodiment two - guide surfaces 11 and 5 extending inclinedly with respect to the longitudinal center line of the locking device 1, wherein upon rotation of the locking device 1 the guide surface 5 slides along the pin 17 and thus the pin 6 connected to the locking device 1 is moved upwardly out of its anchorage opening 13.

Figure 5 which corresponds to Figure 4c shows the transport securing arrangement according to the invention after a further rotary movement of the locking device 1, whereby the securing hook 10 has passed into its maximum pivoted position by way of the projection 18, by the cam-shaped portion 7 of the locking device 1.

Figures 6a through 6c show the next condition in the time sequence, wherein, as can be seen in particular from Figure 6a, the projection 18 on the securing hook 10 has now passed into the recess 8 of the cam-shaped portion 7, whereby the pin 6 is fixed in the locking device 1 against the force applied thereto by the spring 12. It can also be seen that the securing hook 10 now no longer rests on the support surface 23 on the

static housing of the locking device 1 and that the pin 6 has been moved completely out of its anchorage opening 13, whereby the spring 12 acting on the pin 6 has been compressed to its maximum. In that condition the side extension arm 15 is in the unlocked and non-secured transport position and can now be moved out of that position.

Figure 7 shows the condition of the transport securing arrangement according to the invention after implementation of the operations described with reference to Figures 2 through 6, in which respect, as a distinction to Figures 2 through 6, the handle 9 has been actuated in the clockwise direction. This shows that the locking device 1 is releasable by rotary movement, independently of the direction of rotation. In the present embodiment that is achieved in structural terms by the arrangement of two guide surfaces 5 and 11 with opposite screw directions, so that, upon rotation of the locking device 1 in the counter-clockwise direction, the pin 17 slides along the guide surface 5 and, upon rotation in the clockwise direction, it slides along the guide surface 11, whereby in both cases the pin 6 is moved upwardly out of its anchorage opening 13. Attention is directed in particular to the mirror-inverted positions of the guide surfaces 5 and 11 in Figures 6b and 7b.

In Figures 8a through 8c the side extension arm 15 has already been partially moved out of its transport position in the direction of the working position, whereby the securing hook 10 has come into contact with the pin portion 4, at its inclined outside edge 21, and has thereby been pivoted, which has moved the pin 18 out of the recess 8 of the cam-shaped portion 7 and has thereby released the cam-shaped portion 7 of the locking device 1. Thereby, the pin 6 has been urged downwardly on to the side extension arm 15 by the spring 12 so that the pin 6 now bears against the side extension arm 15.

In Figures 9a through 9c the side extension arm has been moved into its fully extended working position. The pin 6 has been urged by the spring 12 into the outer anchorage opening 19 and the securing hook 10 now again bears against the support surface 23 on the static part of the housing of the locking device 1. Overall therefore the side extension arm 15 is in its fully extended working position in which it is locked by the locking device 1.

Figures 10a through 10c show the transport securing arrangement according to the invention after unlocking of the locking device 1, with the side extension arm 15 still being in its working position. It can also be seen that the securing hook 10 now no longer bears against the support surface 23 on the static part of the housing of the locking device 1 but with its projection 18 fixes the cam-shaped portion 7 whereby the pin 6 is fixed in its illustrated position.

Figures 11a through 11c correspond to Figures 8a through 8c, with the difference that the side extension arm 15 is now moved out of its fully extended working position in the direction of its inward transport position. In this case, the securing hook 10 has been pivoted by contact of its inclined inside edge 22 with the pin portion 4, whereby the cam-shaped portion 7 has been released from the projection 18 and the pin 6 is pressed against the side extension arm 15 by the spring 12. As soon as the pin 6 passes over the anchorage opening 13, by virtue of the movement of the side extension arm 15, the pin 6 is urged into the anchorage opening 13 by the spring 12 and the side extension arm 15 is thus locked by way of the locking device 1. The securing hook 10 is also urged by the spring 3 into its locking position in which it embraces the pin 4 so that the side extension arm 15 is doubly secured in its transport position.